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RANGE CONDITION REPORT
NATIONAL RESOURCE LANDS
FOR
WYOMING

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Range Condition Report
(National Resource Lands)

State of Wyoming

I. Background

Conditions on national resource lands in Wyoming reflect the history of the range livestock industry over the past 100 years. This span covers three distinct "management eras": (1) the open range period, 1870 to 1934; (2) the inventory and adjudication period, 1934 to 1964; and (3) the intensive management period, 1964 to the present.

The open range era began with the large cattle drives in the 1870s and the establishment of vast ranching enterprises. Cattle numbers in the state increased from 36,000 in 1867 to 780,000 in 1885 (Fink, et al 1956). Drought, overgrazing and the severe winter of 1886-87 were the beginning of the end for these large ranch operations. A new style of operation began with the influx of homesteaders and fences. Choice lands became the headquarters for smaller ranch operations. Fences were used to reserve winter feed supplies and provide some measure of tenure and control of the cattle using the public domain. Cattle numbers gradually increased and competition for available forage was acute. Unlike the buffalo, which migrated as conditions dictated, livestock were confined to the same areas of use season after season, year after year. The result was a gradual deterioration in range and watershed conditions.

Sheep began to appear on Wyoming rangelands in the mid 1880s and by 1894 outnumbered cattle by more than a million (Fig. 1). In 1933-34, sheep numbers in Wyoming reached a peak of 3.7 million (Fig. 1). These sheep operations were mostly nomadic and many spent all year on the public ranges. Trailing was extensive. Many sheep were wintered in the mild basin areas of Nevada, Utah and southwest Wyoming. The spring "rush" to summer ranges and competition for the best feed added to the declining range conditions. Competition for forage, particularly on browse and shrub ranges, had a marked effect on antelope, deer and elk populations.

Management by "local rule" was ineffective. The only way an operator could hold an area of free range was to keep it fully stocked. This, of course, resulted in severe overgrazing during drought years.

The creation of the Forest Service in the early 1900s marked the beginning of management on the public lands. The restrictions placed on forest ranges diverted considerable use to the remaining public domain, thus compounding range-use problems.

Conditions gradually deteriorated. The economic depression and severe droughts of the late 1920s and early 1930s brought the era to a dramatic close. Ranchers as well as concerned conservationists demanded action to halt the devastation and bring about control and tenure on the public lands

The second era began with passage of the Taylor Grazing Act and establishment of the Grazing Service.

The resource surveys and adjudications of grazing privileges that followed resulted in elimination of much of the conflicting livestock use.

In Wyoming, sheep numbers began to decline and cattle numbers stabilized. In fact, the decline in sheep numbers is still continuing and in 1974 the number of cattle exceeded the number of sheep for the first time in the state's history (Casper Star-Tribune, Oct. 6, 1974). This continuing trend has resulted in a gradual conversion from sheep to cattle. Management of these conversions must include full consideration for proper livestock/forage/season-of-use relationships. Conversion decisions in the past have often been based on administrative expediency rather than on phenological requirements of vegetation or effects on other resource uses.

The adjudication effort was a long and often painful process and consumed most of the range management manpower. Old ways are hard to change and, in this respect, many Wyoming ranchers are not different from other members of the populace. In many cases, this factor has had an influence on adjudications. Compromises resulted that were less than desirable for proper resource management. Some reductions were never fully implemented on the premise that the "slack" would be off-set by better management,

range rehabilitation projects, increased water development, and the elimination of trespass. In many cases, those remedies helped slow and even reverse the downward trend in range conditions. Fences and water developments have helped in the control of livestock. Livestock operators have also contributed through better management, improved breeding herds, and substantial amounts of voluntary non-use. However, these efforts have not succeeded in reversing trends begun in the preceeding era. Intensive management was not provided as a follow-up to adjudication. Even after substantial reduction in livestock numbers, remaining animals continued to concentrate on choicer areas and near water. These areas continue to be overused and reflect downward trends.

Wildlife use is an important factor in management of national resource land. There has been a general increase in the number of game animals harvested in the state since 1941 (Kearl, 1967). Figures 2, 3, 4 and 5 show the extent of these increases.

Annual elk harvests in the state, which averaged about 6,000 head in the 1941-1945 period, have increased rather gradually to an average of 10,597 head in the 1961-1965 period. Deer harvest increased from an annual average of less than 10,000 head to more than 75,000 head for the same periods. Antelope harvests have also increased from less than 11,000 head to more than 32,000 head. Antelope harvest, incidentally was 1,419 head in 1935.

Long-term data on sage grouse harvests is not available. However, the harvest was about 28,000 birds in 1951, averaged less than 39,000 birds in the 1956-1960 period and averaged more than 55,000 birds a year from 1961 through 1965.

There may be a number of reasons for this increase in harvest of game animals. The war may have depressed the harvest between 1941 and 1945. Apparently many more hunters were in the field in the immediate post-war period, 1946 through 1950. However, big game harvests in those years, while significantly higher than in 1941-1945, still were much lower than after 1950.

Some suggested that stock water developments contributed to significant increases in game animal numbers, particularly antelope. Extensive developments since 1930 resulted in more uniform distribution of stock water over the plains area of Wyoming and a greater certainty of supply.

A third reason for the increase in numbers and harvest of game animals may have been the more effective control of predatory animals. Before 1946, predator control was difficult and depended largely on steel traps and rifles. Control of predators improved in the post-war years after development of effective poisons. However, in most cases alleged increases in wildlife, particularly big game animals, resulting from predator control have not been documented.

Other factors which may account for the increase include a reduction in illegal harvest (poaching), and more complete reporting. Both of these factors, however, must surely be small in considering the great increase in harvested animals.

The conclusion is that there has been a great increase both in game animal population and harvests during this period.

Conflicts have arisen over the use of fencing as a range-management practice. Fencing is essential to regulate use of range areas and to improve livestock distribution. It has also been used extensively as a substitute for herding sheep in eastern Wyoming.

Fencing has not been used extensively as a substitute for herding sheep in areas west of the Big Horn Mountains. However, it has been used in all areas to separate landownerships on private lands or range allotments on public lands. Fencing may be used more extensively in the future as a substitute for herding sheep and as a tool in intensive management. The economics of the livestock industry are forcing many operators to fence their range.

Sagebrush spraying has also been a center of controversy. Some conservationists and wildlife interests oppose sagebrush control because it is detrimental to habitat for certain wildlife species. The principal game species cited is the sage grouse. There is some opinion that sagebrush control is detrimental also to deer, elk and antelope habitat.

Conflicts between game animal use and watershed work are having an impact on soil and water conservation. Some of the range improvement practices which have been opposed as detrimental to game animal or game bird habitat are quite clearly beneficial to soil and water conservation.

Ranch operators have made extensive use of public lands by grazing. The range livestock economy of Wyoming cannot afford cessation of grazing of public lands. The attendant reduction in economic activity would result in a hardship in small economic areas and in the economy of the State. Grazing is and should continue to be an essential and important use of public lands.

The present era (1965 to 1974) has been a time of tremendous challenge to resource management. New programs and uses are making demands on the national resource lands; likewise, traditional programs are increasing in scope and complexity.

The public's environmental awakening and demand for consideration of the ecological effect of all activities have given us a new set of values.

Off-road vehicle use, wild horse management, and energy development are examples of new factors affecting the range program in Wyoming.

The development of new energy resources may adversely affect conditions in Wyoming. With the exception of Alaska, exploration

efforts for oil and gas in Wyoming are larger than in any other state. In connection with these efforts, there are severe surface disturbances by seismographic operations. Seismographic trails stretch in all directions across national resource lands in Wyoming. Accelerated interest in uranium in the 1950s resulted in extensive damage to the surface resources. Today some large areas are being stripped for jade, and others for coal development.

Pressure for more access to national resource lands will open the ranges to more use than ever before and this will have its effect on range conditions.

The preceding era provided the records, adjudications, and interim stocking levels for the range program. This era also fostered the development of new concepts and new methods in range management. These new management tools - intensive management plans and grazing systems - are being used in Wyoming and our experience has shown that they will work. However, the manpower and money presently available are not sufficient to accelerate the program.

It is imperative that the intensive livestock management program be accelerated if we are to meet increased demands for livestock products, provide forage for increased numbers of wildlife and wild horses, reverse downward trends on our ranges and watershed, and provide for multiple use.

Rangeland and watersheds constitute one of the most important resources in Wyoming. Historically, range areas of Wyoming have been used for livestock grazing and this use is still the most important agricultural activity in Wyoming.

II. Present Situation

1973 Calendar Year

A. Statistics

1. Livestock

	Cattle	Sheep & Goats	Horses	Total
No. Authorized	828,292	1,796,267	2,404	2,626,963
AUMs Authorized	1,456,463	724,946	10,531	2,191,940

This data includes both sec. 3 and sec. 15 lands.

	Sec. 3	Sec. 15	Total Authorizations
No. Licenses, Permits & Leases	1,187	1,807	2,994
AUMs Authorized*	1,557,078	634,862	2,191,940

2. Wild Horses and Burros

Numbers	AUMs Required ^{1/}	AUMs Reserved
8,163	76,787 (Federal)	0

3. Wildlife

a. Big Game

Kind	Numbers ^{3/}	AUMs Reserved ^{2/}
Antelope	111,450	87,322
Mule Deer	134,500	102,387
Whitetail deer	750	420

^{1/} As per 1974 Nevada Study. Each horse = 1.2 animal unit

^{2/} Based on 1973 annual grazing statistical report.

^{3/} These animals spend at least part of the time on national resource land.

* includes non-use.

Elk	24,225	16,716
Moose	1,790	1,253
Mountain Goat	10	20
Bighorn Sheep	1,020	835
Upland game birds	<u>176,375</u>	<u>0</u>
	Total	208,953

B. Management Situation

1. Land Pattern

An extensive checkerboard pattern resulting from railroad grants exists in Rock Springs and Rawlins. The Casper District also administers national resource lands which are widely scattered, although not checkerboarded. This pattern of intermingled federal and unfenced non-federal land contributes considerably to management problems.

At least half of Wyoming's wild horse population exists on checkerboard lands and future wild horse management will require cooperative agreement with many non-federal land-owners. In addition to wild horse management, the land pattern causes management problems relating to construction of range improvements, administration of trailing permits, and public access.

2. Unique Management Problems, Issues

In the Rawlins and Rock Springs districts a large amount of "non-use" is approved for sheep operations. Applications

are now being received to activate this use with a change to cattle. This non-use has historically made possible an increase in wild horse populations, even though no forage has been allocated to them. As past sheep "non-use" privileges are activated for cattle, and as wild horse numbers continue to rise, competition for forage will increase and range and water conditions can be expected to decline.

On the Rawlins and Rock Springs districts there exists a vast acreage of relatively undeveloped landscape known as the Red Desert. Some user groups are actively opposing construction of any range improvements in this area, thus contributing to the problem of improving livestock control and management.

Considerable livestock trailing occurs on many of the districts, especially sheep trailing which increases the necessity of improved grazing management.

In some districts, particularly Rock Springs (Pinedale Resource Area) and Worland, a large amount of the historic, authorized livestock use is exclusively by cattle during the spring. Active use on several allotment areas is almost entirely during May and June. This occurs at a time when forage plants are susceptible to grazing damage. Spring use only makes it difficult to implement an effective grazing system, particularly one that employs

rest-rotation grazing with a seed trampling treatment. The large numbers of livestock on the range for this short period of time require a large number of water developments.

Some areas are overobligated for the season established -- too much use is concentrated over a short period.

Intensive management is required to maintain grazing capacity so that further reductions in active use are not required.

On some areas in Wyoming, grazing management by itself, even though it reverses downward range trend and results in slow upward trends, results in a relatively slow response in forage production increases. This is due to a high density of big sagebrush and its competition with forage plants. Brush control practices in a grazing system result in a much more rapid forage increase than that which can be expected from grazing management alone. Any such brush control projects have a high potential for conflict with wildlife use.

3. Other Land Uses

All districts (Casper, Worland, Rawlins, and Rock Springs) have areas of intensive oil and gas development. Some of this activity conflicts with livestock management. In addition to oil and gas activities, bentonite claims, uranium

mining and desert land entries have removed acreage from grazing use.

The large number of wild horses presents difficulties in establishing grazing management systems. Also, without control of numbers, the increase of wild horses will result in overstocking of the forage resource.

Many miles of existing fisheries streams are in unsatisfactory condition, much of it due to poor livestock management practices, and agricultural land development.

As stated previously, extensive wildlife migrations occur on most of the districts. Fencing necessary to control livestock often hinders this migration. Some fences are being modified. We are of the opinion that past adjudications of forage did not adequately provide for wildlife. Subsequent increases in wildlife numbers accordingly increase this deficiency.

Fences, and poor gate locations and latches also conflict with recreational uses such as hunting and rockhounding. Some recreational and other land users also leave gates open, allowing livestock in areas where they are not authorized.

C. Status of Grazing Management

As of 1974

	<u>Intensive Mgt.</u>	<u>Interim Mgt.</u>	<u>Custodial Mgt.</u>	<u>Total</u>
No. Existing Plans	61	0	0	61
No. Plans Required	1,174	0	0	1,174
Acres Existing	1,716,001	13,747,676	2,422,173	17,885,850
Acres Optimum	15,463,677	0	2,422,173	17,885,850
AUMs Authorized Present	218,975	1,176,994	795,971	2,191,940
AUMs Authorized Optimum	2,499,395	0	325,712	2,825,107

The total of AUMs now authorized (2,191,940) includes a substantial portion of authorized non-use. It also includes an undetermined amount of non-use licensed as active use but not taken due to overobligation of the range, or other reasons. Therefore, the projected increase in carrying capacity at full implementation (606,538 AUMs annually) may be less than the actual increase possible. Intensive management systems may be required to reach the present (forage) obligation in addition to reaching the projected increase of 606,538 AUMs annually.

Unless intensive management is implemented on the 15.4 million acres, further reductions in livestock use can be expected before 1990. AMPs would be necessary following reductions to stop further declining of range conditions.

Definitions: Intensive Mgt. = AMP-controlled use & authorization

Interim Mgt. = Proposed for intensive, but not yet operational

Custodial Mgt. = Unsuitable for intensive management

D. Resource Condition (current)

1. Range Condition 4/

	<u>Acres</u>	<u>Percent</u>
Excellent	1,234,124	6.9
Good	2,074,759	11.6
Fair	8,978,697	50.2
Poor	4,543,005	25.4
Bad	<u>1,055,264</u>	<u>5.9</u>
Total	17,885,849	100.

Condition, erosion and sediment production are directly related (Branson, 1972, Fig.s 6 & 7).

2. Erosion Hazard Condition

	<u>(0-19)</u> <u>Stable</u>	<u>(20-39)</u> <u>Slight</u>	<u>(40-59)</u> <u>Moderate</u>	<u>(60-79)</u> <u>Critical</u>	<u>(80-100)</u> <u>Severe</u>	<u>Total</u>
Existing Acres	6%	38%	42%	12%	2%	100
<u>4a/</u>	1,073,000	7,852,000	6,367,000	2,093,000	501,000	17,885,850

3. Wildlife Habitat Condition (current)

	<u>Satisfactory</u>	<u>Unsatisfactory</u>	<u>Total</u>
Big Game	11,752,161 acres	3,698,040 acres	15,441,201 acres
Stream Fish	952 miles	714 miles	1,666 miles
Lake Fish	9,045 acres	1,198 acres	10,243 acres
Upland Birds & Small Game	16,340,534 acres	1,743,520 acres	18,084,054 acres

4/ Deming Two-Phase System 1964, adjusted where updated.

4a/ Includes estimated 1,162,036 acres unclassified.

4. Comparison to Non-BLM ownerships

Condition of Private and State Owned Rangelands 1/ (Wyoming)

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>Total</u>
Acreage	4,972,800	13,384,400	7,951,300	700,900	27,009,400
%	18%	49%	30%	3%	100%

- a. Non-federal checkerboard lands have similar range, watershed, and wildlife habitat conditions as national resource lands.
- b. National Forests are generally higher in elevation and do not carry livestock and/or wildlife numbers for as much of the year as do national resource lands and other non-federal lands at lower elevation. With possible exceptions, National Forests are in better condition.
- c. Fenced, privately-owned lands are generally in better range condition than national resource lands. These are generally the more productive lands in the eastern part of the state and river and creek bottoms throughout the state. Unfenced private lands intermingled with national resource lands are estimated to be in poorer range condition.

Privately-owned lands are estimated to have a more favorable watershed condition than national resource lands. Wildlife habitat condition would be similar.

1/ Report of Soil Conservation Service, Wyoming - Range Site System - 1974

E. Resource Trends (current)

1. Range

	<u>Acres</u>	<u>Percent</u>
Improving	2,378,818	13.3
Static	12,251,807	68.5
Declining	<u>3,255,225</u>	<u>18.2</u>
Total	17,885,850	100.

2. Erosion Hazard

	<u>Acres</u>	<u>Percent</u>
Improving	2,056,873	11.5
Static	11,911,976	66.6
Declining	<u>3,917,001</u>	<u>21.9</u>
Total	17,885,850 ^{5/}	100.

3. Wildlife Habitat

	<u>Acres</u>	<u>Percent</u>
Improving	894,292	5.
Static	13,414,388	75.
Declining	<u>3,577,170</u>	<u>20.</u>
Total	17,885,850	100.

4. Trend comparisons to non-BLM ownerships

- a. Range, watershed and wildlife habitat conditions on non-federal, checkerboard lands have trends similar to national resource lands.

^{5/} Includes estimated 1,162,036 acres unclassified.

b. Range, watershed and wildlife habitat conditions on National Forests have more favorable trends.

c. Range and watershed conditions on privately-owned lands have more favorable trends. Trend in wildlife habitat conditions is similar to national resource lands.

III. Projected Resource Condition at Current Management Level

A. Range Condition

	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>Bad</u>	
% of rangeland now	6.9	11.6	50.2	25.4	5.9	100%
% will be in 1990	6.0	10.0	48.0	28.0	8.0	100%
% will be in 2000	5.0	9.0	46.0	30.0	10.0	100%

Under present management levels we can expect a net decline in range conditions as current livestock use continues. We are rapidly approaching the saturation point in developing and supervising AMPs. We expect to have 10 to 15% of the national resource lands under AMPs at the current manpower levels.

Range condition will improve in the areas under AMPs. A downward trend can be expected on those areas not covered by AMPs. Changes in class of livestock, activation of non-use and continued increase of wildlife and wild horse populations will hasten the downward trend if we continue under the current management level.

B. Erosion Hazard

	<u>Stable</u>	<u>Slight</u>	<u>Moderate</u>	<u>Critical</u>	<u>Severe</u>
% erosion now	6	38	42	12	2
% will be in 1990	3	33	44	18	2
% will be in 2000	2	30	46	20	2

Watershed studies indicate that soil erosion will increase 2 to 5% without management change.

C. Wildlife Habitat

	<u>Satisfactory</u>	<u>Unsatisfactory</u>
% of habitat now	80	20
% of habitat 1990	75	25
% of habitat 2000	70	30

A steady decline in wildlife habitat can be expected under current management conditions. Selective grazing by livestock and increases in wild horse numbers will reduce browse vigor and the percentage of desirable species.

D. Resource Production

1. Livestock (AUMs)

	<u>Present</u> *	<u>1990</u>	<u>2000</u>
Cattle	1,456,463	1,458,926	1,403,511
Sheet & Goats	724,946	324,295	162,148
Horses	10,531	75,862	68,275
Total	2,191,940	1,859,083	1,633,934

At the current range trend, we expect a 15% reduction in livestock forage by 1990 and an additional 10% reduction by 2000. It is expected that 75% of the sheep use will be converted to cattle use by 2000.

* Grazing Statistical Report 1973.

2. Wildlife Population

	<u>Present</u>	<u>1990</u>	<u>2000</u>
Deer	135,250	140,000	145,000
Antelope	111,450	100,000	95,000
Elk	24,225	20,000	17,250
Bighorn Sheep	1,020	1,020	1,020
Moose	1,790	1,900	2,000
Upland Birds	176,375	180,000	185,000

Wildlife populations, except deer, are expected to decline under present management because of a continuing downward trend in wildlife habitat. Deer populations are expected to increase back to a more normal level. Antelope numbers have been high for several years, but habitat is being reduced by other competing uses for the land.

Bighorn sheep are expected to remain static. Their habitat areas are under intensive management and numbers are to be controlled at the current level. Elk numbers have been at an all time high recently, but habitat conditions are declining. Moose numbers would continue to show a slight increase. Upland game bird numbers are cyclic, but overall there have been slight increases under present management.

Changes in classes of livestock, season of use and activation of non-use will increase competition for forage in many cases.

3. Wild Horses and Burros

	<u>Present</u>	<u>1990</u>	<u>2000</u>
Populations	8,163	24,500	49,000
AUMs	76,787	230,000	460,000

Wild horse populations are expected to increase at 20% per year. Recent studies show that colt crops are averaging from 26 to 35%. The annual death loss is 10%.

A ratio of 1.2 to 1 was used to compute horse AUMs.

4. Economics (wildlife)

Under optimum Conditions

(Increased harvest x value factor = value increase per animal.

Deer - 2,212 head x \$138	<u>\$305,256</u>
Antelope - 83 head x \$168	<u>13,944</u>
Elk - 116 head x \$459	<u>53,244</u>
Sheep-9 head x \$459	<u>4,131</u>
Moose-43 head x \$600	<u>25,800</u>
Birds-49,450 x \$10	<u>494,500</u>
Total estimated increase value of wildlife	\$896,875

Non-consumptive uses have not been estimated but would likely exceed consumptive uses of wildlife.

Increase values for the species indicated above were made from projections of estimates from the booklet, "Hunting and Fishing, What It Means to Wyoming" by T. A. Walther and J. W.

Birch, Applied Study No. 72, Univ. of Wyo., G&F, Cheyenne, Wyo. and table XIII, Average Dollars Spent by Sportsmen, 1965. These are the latest economic figures available at this time for these projections.

Wyoming has reached the saturation point in the development, operation and maintenance of allotment management plans at current manpower and funding levels. Only 5.6% of the NRL is now managed under allotment management plans.

E. Economics

	<u>Less than 25% Dependent</u>	<u>25-50%</u>	<u>50-75%</u>	<u>More than 75% Dependent</u>
No. Livestock Operations	1,847	950	118	0
No. AUMs Involved (cattle, sheep & horses)	819,786	1,218,719	153,435	

Economic Comparison of Range Livestock on National Resource Lands with all Other Lands in Wyoming (including private, state, National Forest land, National Parks, etc.):

<u>Statewide</u>	
Total stock sheep in Wyoming	1,500,000 <u>1/</u>
Total beef cattle in Wyoming	784,000 <u>1/</u>
Required animal unit months:	
(No.s x 12 months) cattle	9,408,000 AUMs
(No.s x 12 months) sheep	3,600,000 AUMs
State gross income for each Cattle unit = \$166 <u>1/</u>	
State gross income for each Sheep unit = \$11 <u>1/</u>	

1/ Wyoming Agricultural Statistics, 1973

State gross income for ALL
 Stock sheep (11 x 1,500,000 sheep) \$16,500,000

State gross income for ALL
 Beef cattle (\$166 x 784,000 cattle) \$130,144,000

National Resource Lands

NRL livestock use 2/
 Cattle 1,456,463 AUMs
 Sheep 724,946 AUMs

Percent of livestock on NRLs
 Cattle: (AUMs)
 1,456,463 divided by 9,408,000 = 15.4%

Sheep: (AUMs)
 724,946 divided by 3,600,000 = 20.1

Income derived from livestock grazed on NRL:
 Cattle (\$130,144,000 x 15.4% = \$20,042,176
 Sheep (\$16,500,000 x 20.1%) = \$ 3,316,500

IV. Alternative Management Opportunities

A. Optimum Level (with projections)

1. Resource Condition

a. Range Conditions

The declining trend can be stopped and conditions improved under optimum management. This is technically feasible under intensive grazing management concepts.

Range conditions expected are:

<u>Optimum</u>	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>Bad</u>	
% will be in 1990	15	28	35	20	2	100%
% will be in 2000	30	55	10	5	0	100%

2/ Grazing Statistical Reports, 1973

b. Erosion Condition

Erosion conditions can be improved by intensive management on most all lands; however, there will still be natural geologic erosion. An attainable objective of erosion condition is shown under 2 d. below.

c. Wildlife Habitat

The potential for improvement of the wildlife habitat in Wyoming is good. Under optimum management situations the habitat can be restored, maintained and enhanced to accommodate the production shown under 2 c. below.

2. Resource Production

a. Livestock numbers, class, and AUMs

<u>Class</u>	<u>Numbers</u>	<u>AUMs</u>
Cattle	1,517,895	1,610,311
Sheep	2,531,957	1,192,195
Horses	3,000	22,601
Total	4,052,852	2,825,107

With intensive management, we would expect a 28% increase in addition to preventing any further reductions. Reductions of 25% (557,000 AUMs) can be expected if management is not improved. Possible changes in class or seasons could lessen the projected AUM increase.

b. Wild horse and burro AUMs and numbers

4,500 horses, 50,400 AUMs

Projected to the December 1971 level.

c. Wildlife numbers and AUMs

	<u>Numbers</u>	<u>AUMs</u>
Deer	150,000	166,500
Antelope	112,000	95,648
Elk	25,000	100,500
Big horn sheep	1,200	1,548
Moose	2,220	16,405
Upland birds	300,000	2,760

d. Erosion hazard

	<u>Stable</u>	<u>Slight</u>	<u>Moderate</u>	<u>Critical</u>	<u>Severe</u>
% erosion now	6	38	42	12	2
% will be in 1990	9	73	16	1	1
% will be in 2000	10	75	14	1	0

Under optimum conditions, all declining watersheds can be changed to a static or improving condition.

3. Costs

Refer to chart in Section V.

4. Economics (local, state, etc.)

The income from livestock to the State is \$166/year for cattle and \$11/year for sheep (see F. Economics, in this report). Therefore, any increase in production of forage will result in a comparable income increase.

B. Intermediate Level (with projections)

1. Resource Condition

a. Range Condition

The objective would be to stop the downward trend

THE UNIVERSITY OF CHICAGO

DEPARTMENT OF CHEMISTRY

PHYSICAL CHEMISTRY

LECTURE NOTES

BY

PROFESSOR

JOHN D. COLEMAN

CHICAGO, ILL.

1950

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and improve the condition on only those lands that are declining. This would result in an estimated range condition of:

<u>Intermediate</u>	<u>Excellent</u>	<u>Good</u>	<u>Fair</u>	<u>Poor</u>	<u>Bad</u>	
% will be in 1990	10	20	47	20	3	100%
% will be in 2000	15	30	40	15	0	100%

b. Erosion hazard

	<u>Stable</u>	<u>Slight</u>	<u>Moderate</u>	<u>Critical</u>	<u>Severe</u>
% erosion now	6	38	42	12	2
% will be in 1990	7	68	22	1	1
% will be in 2000	8	70	20	1	1

Under an intermediate level of intensive management, only severely eroding areas could be included.

c. Wildlife habitat condition

The declining habitat could be stabilized under an intermediate level of management. The habitat areas that are in a static condition would not improve at this management level. Expected production resulting from improving the declining condition is shown under 2 b. below

2. Resource Production

a. Livestock class and AUMs

<u>Class</u>	<u>AUMs</u>
Cattle	1,437,448
Sheep	1,064,216
Horses	20,174
Total	2,521,838

Intensive AMPs would be developed on those areas with a declining range condition to stabilize or improve these areas.

b. Wildlife numbers

	<u>Numbers</u>	<u>AUMs</u>
Deer	145,000	160,950
Antelope	111,450	95,158
Elk	24,000	96,480
Bighorn sheep	1,100	1,419
Moose	2,000	14,780
Upland birds	215,000	1,978

c. Erosion condition

	<u>Acres</u>	<u>Percent</u>
Improving	5,365,831	30
Static	12,520,009	70
Declining	0	0

d. Wild horses: Number and AUMs

14,000 horses	159,264
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INFORMATION

1. Name	2. Address	3. City	4. State	5. Zip
John Doe	123 Main St	New York	NY	10001
Jane Smith	456 Elm St	Los Angeles	CA	90001
Bob Johnson	789 Oak St	Chicago	IL	60601
Alice Brown	101 Pine St	San Francisco	CA	94101

1. Name of the person to whom the letter is addressed

2. Address of the person to whom the letter is addressed

3. City and State of the person to whom the letter is addressed

4. Zip Code of the person to whom the letter is addressed

5. Name of the person who is sending the letter

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18. Address of the person who is receiving the letter

19. City and State of the person who is receiving the letter

20. Zip Code of the person who is receiving the letter

V. Recommendations (by state)

SENATE RANGE REPORT

STATE	HIGH MGMT. LEVEL					INTERMEDIATE LEVEL	
	Tot. AMPs Req'd (No.)	AMPs Remain. To Be Impl. (No.)	Tot. Impl. Cost (\$ Mil)	Add'l 1/ W. Horse Costs (\$ Mil.)	O&M 2/ Cost/Year After Impl. (\$ Mil.)	Tot. Impl. Cost (\$ Mil.)	O&M 2/ Cost/Year After Impl. (\$ Mil.)
AZ	319	279	31.0	1.7	1.8	23.2	1.4
CA	306	271	11.3	2.3	1.6	8.6	1.3
CO	875	793	33.1	2.3	1.9	25.2	1.5
ID	531	431	23.3	2.0	2.7	17.8	2.2
MT	1,106	909	35.5	1.0	3.6	27.0	2.9
NV	644	557	60.5	6.5	8.1	47.3	6.4
NM	844	651	23.7	1.3	2.9	18.1	2.3
OR	532	404	12.9	2.6	2.1	10.0	1.7
UT	808	641	26.4	2.8	2.6	20.1	2.1
WY	1,174	1,113	44.6	3.8	3.2	34.3	2.6
	7,139	6,049	302.3	26.3	30.5	231.6	24.4

1/ Additional facilities to accommodate management of wild horses and burros

2/ Does not include custodial management, or general administration costs.

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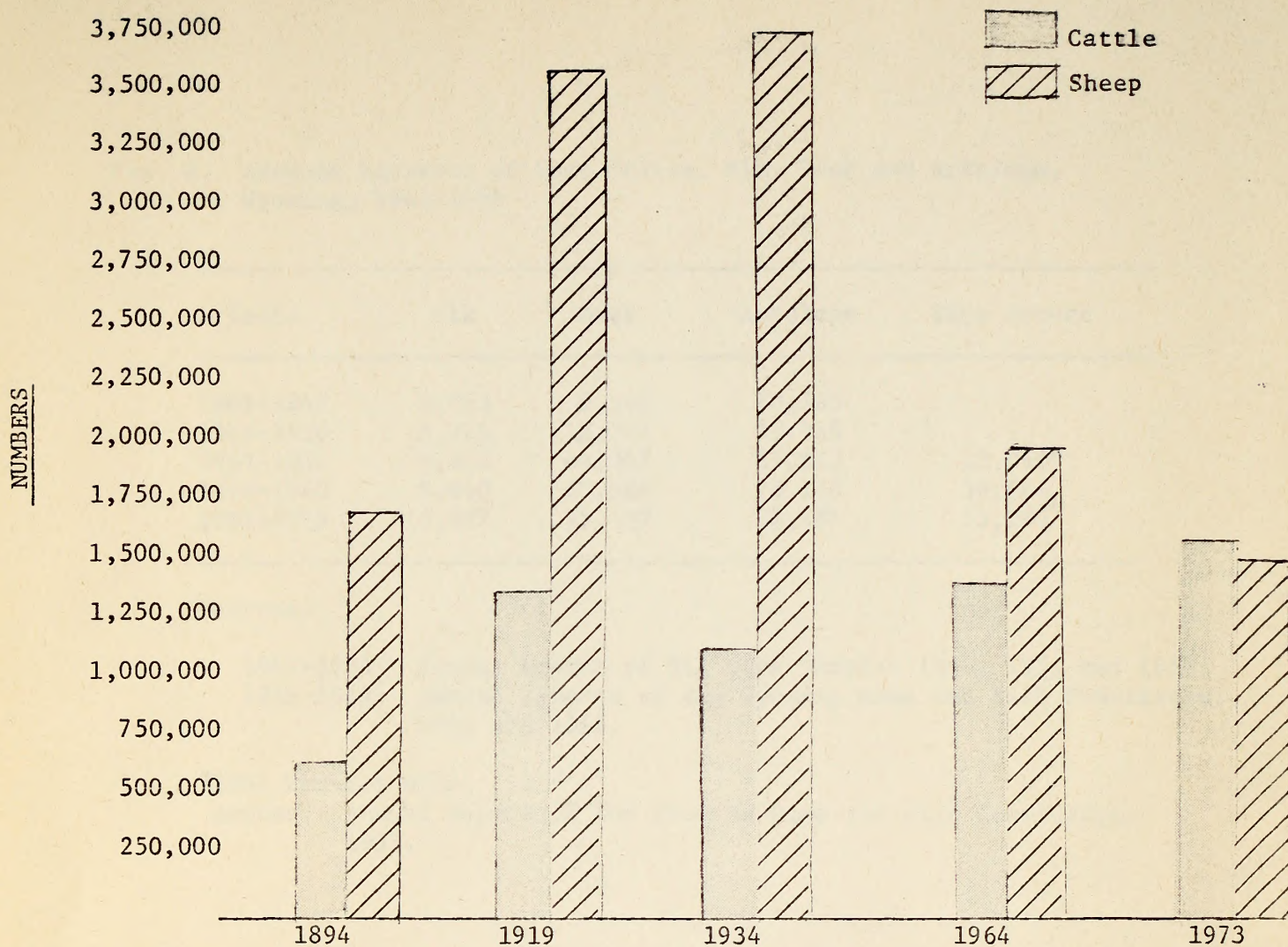


Fig. 1: Total stock cattle & sheep in Wyoming^{1/}

^{1/} From Wyoming Agricultural Statistics, 1973 (Wyo. Crop & Livestock Reporting Service).

Fig. 2. Average Harvests of Sage Grouse, Elk, Deer and Antelope, Wyoming, 1941-1965

Years	Elk	Deer	Antelope	Sage Grouse
1941-1945	6,053	9,562	10,793	
1946-1950	8,225	18,742	13,935	
1951-1955	9,840	44,047	35,822	28,046 ^a
1956-1960	9,940	60,584	26,169	38,666
1961-1965	10,597	75,407	32,485	55,294

Sources:

1941-1954: Annual Report of Big Game Harvest 1950, 1952 and 1954.
 1955-1965: Annual Reports of the Wyoming Game and Fish Commission, 1964 and 1965.

^a1951 harvest only.

Source: Annual Report of the Wyoming Game and Fish Commission, 1951.

20-10-1911, 1912, 1913, 1914, 1915, 1916, 1917, 1918, 1919

1911	1912	1913	1914	1915
1916	1917	1918	1919	1920
1921	1922	1923	1924	1925
1926	1927	1928	1929	1930
1931	1932	1933	1934	1935

1936	1937	1938	1939	1940
1941	1942	1943	1944	1945
1946	1947	1948	1949	1950
1951	1952	1953	1954	1955
1956	1957	1958	1959	1960

Fig. 3. Deer License Sales and Harvest, Wyoming, 1941-1965

Year	License sales ^a			Harvest ^b	Harvest percent of licenses
	Resident	Non-resident	Total		
1941	21,248	559	21,807	8,043	36.9
1942	23,101	577	23,678	11,980	50.6
1943	26,963	1,742	28,705	10,225	35.6
1944	24,829	1,662	26,491	8,536	32.2
1945	27,600	3,321	30,921	9,028	29.2
1946	37,130	1,718	38,848	12,975	33.4
1947	42,368	2,307	44,675	18,752	42.0
1948	47,970 ^c	3,097	51,067	21,019	41.2 ^d
1949	37,770 ^c	3,340	41,110	18,116	41.1 ^d
1950	40,104	4,261	44,365	22,849	51.5
1951	46,487	7,070	53,557	32,072	59.9
1952	56,193	13,161	69,354	40,433	58.3
1953	55,722	14,386	70,108	46,056	65.7
1954	57,466	18,232	75,698	50,547	66.8
1955	52,116	22,277	74,393	51,128	68.7
1956	47,970	18,860	66,830	38,185	57.1
1957	49,863	29,027	78,890	64,807	82.1
1958	49,176	26,491	75,667	62,456	82.5
1959	45,314	28,948	74,262	60,175	81.0
1960	51,575	34,016	85,591	77,298	90.3
1961	50,950	43,158	94,108	84,677	90.0
1962	50,585	47,422	98,007	88,712	90.5
1963	46,857	44,603	91,460	71,499	78.2
1964	46,437	41,807	88,244	68,541	77.7
1965	45,372	43,998	89,370	63,606	71.2

Source: Annual Report of Big Game Harvest, Annual Issues, 1950-1965, Wyoming Game and Fish Commission.

^aPioneer hunting and fishing licenses not included. In 1965, 6,278 such licenses were issued, but only 3,226 holders hunted and they killed 1,667 deer.

^bIncludes harvest by pioneer license holders.

^cDeer and elk licenses were sold as a combined license from 1941 through 1948. The reduction in sales in 1949 is due primarily to separation of these permits.

^dComparisons between 1940-1948 and 1949-1965 time periods are not valid because of differences in type of licenses sold.

Fig. 4. Elk License Sales and Harvests, Wyoming, 1941-1965

Year	Resident	License sales ^a		Harvest ^b	Harvest- percent of licenses
		Non-resident	Total		
1941	21,248	559	21,807	5,076	23.3
1942	23,101	506	23,607	9,046	38.3
1943	26,963	1,697	28,660	8,318	29.0
1944	24,829	1,570	26,399	3,338	12.6
1945	27,600	3,190	30,790	4,987	16.2
1946	37,130	1,230	38,360	9,197	24.0
1947	42,368	1,454	43,822	7,209	16.5
1948	47,970 ^c	1,505	49,475 ^c	7,036	14.2 ^d
1949	19,226 ^c	1,500	20,726 ^c	8,559	41.2 ^d
1950	20,596	1,912	22,508	9,122	40.5
1951	23,342	2,541	25,883	11,814	45.6
1952	23,423	2,521	25,944	7,816	30.1
1953	21,146	2,500	23,646	9,826	41.6
1954	22,170	2,500	24,670	10,189	41.3
1955	21,795	2,500	24,295	9,554	39.3
1956	23,435	2,704	26,139	11,839	45.3
1957	22,742	2,514	25,256	7,726	30.6
1958	23,970	2,454	26,424	11,483	43.5
1959	21,364	2,510	23,874	9,266	38.8
1960	22,914	2,532	25,446	9,388	36.9
1961	23,394	3,016	26,410	11,422	43.2
1962	23,194	3,025	26,219	6,541	24.9
1963	24,843	3,014	27,857	10,299	37.0
1964	27,825	3,117	30,942	12,163	39.3
1965	29,650	3,983	33,633	12,564	37.4

Source of Data: Annual Report of Big Game Harvest, Annual Issues. 1950-1965, Wyoming Game and Fish Commission.

^aPioneer hunting and fishing licenses not included. In 1965, 6278 such licenses were issued but only 1,659 hunted and they killed 510 elk.

^bIncludes harvest by pioneer license holders.

^cDeer and elk licenses were sold as a combined license from 1941 through 1948. The reduction in sales in 1949 is due primarily to separation of the permits.

^dComparisons between 1940-1948 and 1949-1965 time periods are not valid because of differences in type of licenses sold.

Fig. 5. Antelope Populations, License Sales and Harvest, Wyoming, 1941-1965

Year	License sales ^a			Harvest	Harvest- percent of licenses	Antelope population
	Resident	Non-resident	Total			
1941	4,993	637	5,630	5,337	94.8	--
1942	6,220	532	6,752	6,050	89.6	--
1943	10,557	761	11,318	14,863	131.3	54,000
1944	8,526	1,060	9,586	10,573	110.3	--
1945	10,681	4,541	15,222	17,143	112.6	--
1946	8,416	1,771	10,187	9,109	89.4	48,000
1947	9,160	2,208	11,368	10,521	92.5	65,700
1948	13,554	3,434	16,988	15,912	93.7	65,661
1949	10,094	1,792	11,886	11,340	95.4	50,000
1950	20,091	4,274	24,365	22,792	93.5	76,856
1951	30,848	10,533	41,381	39,315	95.0	90,000
1952	30,101	13,077	43,178	41,020	95.0	92,779
1953	24,595	15,074	39,669	34,909	88.0	97,500
1954	20,844	13,500	34,344	30,776	89.6	108,027
1955	21,559 ^a	15,483	37,042	33,090	89.3	103,612
1956	16,234	9,787	26,021	23,013	88.4	105,264
1957	16,891	13,084	29,975	25,708	85.8	109,906
1958	16,243	11,576	27,819	23,910	85.9	110,000
1959	16,130	15,373	31,503	26,542	84.3	140,000
1960	18,355	17,816	36,171	31,674	87.6	175,000
1961	19,473	21,201	40,674	34,873	85.7	Increasing
1962	19,593	23,969	43,562	37,444	86.0	Increasing
1963	19,125	23,011	42,136	35,590	84.5	Declining
1964	20,476 ^a	17,294	37,770	28,945	76.6	Declining
1965	12,452 ^b	15,617	28,069	23,944 ^b	85.3 ^b	--

Sources: Annual Report of Big Game Harvests, Annual Issues, Wyoming Game and Fish Commission. Antelope Population Data from "Position Statement on Woven Wire Fencing on the Public Lands in Wyoming," Wyoming State Office, U.S. Bureau of Land Management.

^aIncludes pioneer licenses, 1955 through 1964.

^bDoes not include pioneer licenses. An additional 1,629 antelope were killed by pioneer license holders.

